

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. – 36. (Canceled).

37. (Previously Presented) An ion implantation system comprising:  
an ion source chamber comprising:

an ion source disposed within the ion source chamber and having a toroidal plasma generator to generate a plasma having theta symmetry about a center line of the toroidal plasma generator, and

an ion source aperture aligned essentially along the center line,

whereby ions are ejected from the ion source chamber through the ion source aperture as an ion beam in motion essentially along the center line; and

a focusing element disposed along a path of the ejected ions to focus the ion beam onto a substrate for implantation into the substrate.

38. (Original) The ion implantation system of claim 37 further comprising a first extraction electrode disposed to accelerate ions from the ion source toward a second extraction electrode.

39. (Currently Amended) The ion implantation system of claim 37 wherein the toroidal plasma generator includes a first core and a second core, the first core and the second core being aligned essentially along ~~the~~ **the** center line of the toroidal plasma generator.

40. (Canceled).

53. (Previously Presented) The ion implantation system of claim 37 wherein the ion source is a multicore plasma generator comprising:

an inlet configured to receive a plasma precursor, the inlet in fluid communication with a first plasma current path and with a second plasma current path;

a first conduit passing through a first transformer core; and

a second conduit passing through a second transformer core,

wherein the first conduit is essentially colinear with the second conduit.

54. (Previously Presented) The ion implantation system of claim 37 wherein the ion source is a multicore plasma generator comprising:

an outer shell surrounding a first inner shell housing a first toroidal transformer core; and

a second inner shell housing a second toroidal transformer core, wherein the first toroidal transformer core and the second toroidal transformer core are disposed along the center line.

55. (Previously Presented) The ion implantation system of claim 54 wherein the first inner shell is supported within the outer shell by a web allowing circulation of secondary plasma current around the first inner shell within the outer shell.

56. (Previously Presented) The ion implantation system of claim 55 wherein the web contains an electrical lead connected to a primary coil disposed to couple electromagnetic energy to the first toroidal transformer core.

57. (Previously Presented) The ion implantation system of claim 54 wherein the first inner shell includes a shaped bottom portion to provide a circular cross section to the first inner shell.

58. – 61. (Canceled).